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TECHNOLOGY DEPARTMENT

SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE • JAN. 3, 1948

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GENERAL SCIENCE—AAAS

Research on Man Needed

In an address as retiring president of AAAS, President Conant of Harvard urges applying scientific method to study of how to live and work together.

In the past week, scientists gathered in Chicago for the annual Christmas meetings of the American Association for the Advancement of Science. This issue contains many reports from the meetings as indicated by AAAS in the line above the head. More will follow next week.

➤ TO PRESERVE and continue that unique adventure in living that is the American way, scientific research must be undertaken on man's own activities, President James B. Conant of Harvard University declared in his address as retiring president of the American Association for the Advancement of Science.

President Conant spoke in full knowledge that many of his colleagues in the more or less exact sciences would regard as heresy any proposal to admit social studies to the ranks of acknowledged sciences. Himself a chemist of high standing as well as a successful university administrator, he "took the dare." Admittedly, he said, in the social sciences there is a high degree of empiricism—that is, in them there is little mathematical certainty and a great deal of plain cut-and-try.

But he called his colleagues' attention to an analogous situation in the ancient art of healing, where intensive and massive scientific research programs have greatly reduced the degree of empiricism and given the practitioner a correspondingly greater amount of sure expectation. As much, he feels, can be done by applying the scientific method to "the likewise ancient art of counselling human beings as to how to live and work together."

As for the immediate future, President Conant expressed hopefulness:

"Conceivably we may all be blown up by atomic bombs within the next few years as some of my colleagues seem to think. Their reasons for this dire prediction, however, appear to me to be quite inadequate. I prefer the contrary assumption. I have faith that we shall be wise enough to escape a global war.

"I likewise believe that we will move forward to still greater strength and prosperity as a democracy, and that the morale of the nation will continually improve as we demonstrate that our American ideals are no mere myths or legends. And in this all important undertaking, I have confidence the skill and wisdom of the scientists cooperating with practitioners will play an important part."

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BIOLOGY—AAAS

Sex Evolution Traced

Cell reproduction is induced in "sexless" cells with synthetic grown hormone, making possible study of process. Brings out primitive ancestral characters.

➤ HOW SEX came into existence has apparently been shown in a study of cells usually considered sexless, with a growth-control chemical used to stimulate them into renewed multiplication. Details of the study were presented by Dr. C. Leonard Huskins of the University of Wisconsin. Associated with Dr. Huskins in his research were Lotti M. Steinitz, R. E. Duncan and Rhona Leonard.

The discovery started with a successful effort to induce division in plant cells no longer considered capable of this reproductive process, by treating them with dilute solutions of the synthetic growth hormone, indole-3-acetic acid. Division readily occurred, revealing complex details of chromosome structure not hitherto reported. The divisions were of the type usually found only in the active sex cells of plants.

Sex evolution proceeded in four steps, according to Dr. Huskins' interpretation. First, nuclear division took place within the cell, without the cell itself dividing. Then there were mutations or evolutionary changes in the two that rendered each less efficient without the other—a kind of biological precedent for all romances. The third step was a halving of the chromosome numbers within the body-cells. Finally came the union of the two "incomplete" cells into one, which is the physical basis of all sex.

The great complexity of structure which Dr. Huskins and his co-workers discovered in chromosomes is likely to have far-reaching effects, both in genetic theory and in practical plant and animal breeding. Genes, the units of bodily inheritance, hitherto regarded as indivisible units, may now have something happening to them like what happened to the atom—it looks as if it will turn out to have a more or less elaborate internal structure, which in turn will make its modification possible.

One thing that happened in stimulated "sexual" division of body-cells in strawberries and oats was the appearance of plants of primitive, presumably ancestral character. This promises to make possible the finding of elusive "wild" ancestors of cultivated plants simply by breeding them out of their more complexly developed descendants.

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RESOURCES—AAAS

Soft Coal Called Key to Nation's Continued Power

➤ NOT atomic power, but old-fashioned coal—dirty, smoky soft coal—is the key to America's continued prosperity and power, scientists heard from Prof. S. W. Hockett of Iowa Wesleyan College.

Prof. Hockett described some of his own experiments on Iowa coal, which is quite literally the Cinderella of American soft coals. By carbonizing it at relatively low temperatures—around 500 degrees Centigrade—he was able to produce good, easily cleaned fuel gas, a high-grade, easily ignited coke, and an abundance of coal tar products.

Small units for low-temperature carbonation of soft coal have recently been developed, he stated. It appears feasible to move them about on trucks so that they can operate at the pit-head or even down in the mine itself. Gas thus produced can be either piped to nearby cities or bottled and sold to rural users. Shipping costs should be much lower on the more compact products of the new technique.

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Tech

NUCLEAR PHYSICS-AAAS

Predict Heavier Elements

Numbers 97 and 98, undiscovered as yet, pose a major difficulty in finding the necessary starting materials. May have masses as high as 247 and 248.

➤ THE synthetic manufacture and identification of chemical elements heavier than curium, number 96, at present tops in atomic number and weight, will be possible, Dr. Glenn T. Seaborg of the University of California predicted in the Sigma XI lecture before the American Association for the Advancement of Science in Chicago.

The major difficulty in making new undiscovered elements 97 and 98 will be finding the necessary starting materials, he told the scientists. From their knowledge of how these heaviest elements are built up, the chemists can predict that the most stable and the longest-lived varieties or isotopes of elements 97 and 98 will have masses as high as 247 and 248 and higher.

Curium's heaviest isotope is only 242 and from it upward is quite a jump.

However, Dr. Seaborg has some good guesses about the chemical properties of such new elements, and he intends to use this information in attempting to create the new elements in the future.

Co-discoverer of atomic bomb element, plutonium, 94, as well as americium, 95, and curium, 96, Dr. Seaborg explained that of the 96 known elements, 94 have been isolated in quantities sufficiently large to see and weigh them. Astatine 85 and francium 87 may never be separated out in such quantities and in Dr. Seaborg's opinion may remain unique in being the rarest of chemical elements.

Eight chemical elements, four of them beyond uranium 92, and four filling gaps in the periodic table, at 43, 61, 85 and 87, have been discovered within the past ten years.

The metals gold, silver, copper, iron, lead, tin, mercury and also possibly zinc, as well as the non-metals, sulfur and carbon, were all known and written about some 2,000 years ago. A number of these were known 5,000 years ago and some probably were recognized and used in prehistoric times, Dr. Seaborg declared. The alchemists identified the substances arsenic, antimony and bismuth during the period from the twelfth through the sixteenth centuries. Platinum was probably the "white gold" of that period.

The first individual identified as a chemical element discoverer was a German merchant, Hennig Brandt, who first brought to light the element phosphorus in 1669. A dozen elements were discovered in the eighteenth century, while most of the remaining elements, about 60 in all, were discovered in the nineteenth century.

The atomic weights of the elements are based upon the lightest of them, hydrogen, taken as one, and until the discovery of the four trans-uranium elements, uranium was the heaviest, with a variety or isotope 238 times the weight of hydrogen as the most prevalent natural form of this relatively rare element. The elements were also arranged in order by atomic numbers, from hydrogen 1 to uranium 92 by H. G. J. Moseley, killed in the first World War, and this is now extended to curium 96.

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ENGINEERING

Barge Climbs Banks

➤ THE latest thing in a seaboat that will travel on land is a new Navy amphibious vessel. It is called a "walking" barge, and it can navigate through surf, soft mud, sand and quagmires as well as sail the ocean or climb embankments.

It is dubbed a walking barge because of its method of travel when out of sailing water. It consists of three lengthwise pontoons placed side by side. The center pontoon can be raised 17 inches, moved forward ten feet, and lowered. Then the two side pontoons step forward in a similar way, and do so at the same time.

The vehicle can carry 60 tons of men and cargo. Each of the outer pontoons is 60 feet long, six feet wide, and slightly more than nine feet high. The center pontoon is 44 feet long, 16 feet wide

***WATER-LAND BARGE**—This is a model of a "walking" barge which can haul 60 tons of men and materials across mud, sand and surf; it is propeller driven in the water and is completely amphibious.*

and six feet high. The entire barge is of all-welded construction, and all three pontoons are divided into watertight compartments.

The craft has now successfully passed initial tests. These included climbing steep embankments in addition to travel in mud, sand and surf. Traction in mud flats is obtained through vertical fins installed in the bow of the inner pontoon and in forward sections of the others. They are automatically raised into the hull as the barge makes a forward step and lowered into the mud when it touches.

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PSYCHOLOGY-AAAS

Stress May Be Ulcer Clue

➤ MEN are more likely to have stomach ulcers because women, although they react more to stress, relax more rapidly and recover more quickly.

The answer to sex differences in ulcers is explained by the way boys and girls react to stress, Dr. L. W. Sontag, of the Fels Research Institute, Yellow Springs, reported.

Dr. Sontag found that girls react more to stress, but that they also relax and recover more effectively than boys. The experiments included plunging a child's hand or foot into cold water for a minute, or tilting the person tested head down at a 45-degree angle for two and a half minutes, and then measuring changes in heart rate, blood pressure, electrical resistance of the skin, and other physical clues to emotion.

Although the shock of cold water or turning upside down is purely physical, Dr. Sontag explained that it produces almost exactly the same kind of physiological changes as do shocks of a mental or emotional nature.

Dr. Sontag's findings fit in with facts discovered earlier in collaboration with Dr. Hudson Jost. Cousins were found to be much more alike in reaction to stress than unrelated children. Brothers or sisters are more alike than cousins, and identical twins are even more alike.

All this suggests to Dr. Sontag that the way a person behaves under stress is in part due to his inheritance.

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ETHNOLOGY-AAAS

Baby Care Just Average

➤ AMERICAN infants get just about average treatment compared with babies in other parts of the world, Dr. John W. M. Whiting, of the State University of Iowa, is convinced.

How mothers of 85 different peoples, including the U. S. A., feed their babies and wean them, teach them manners in regard to toilet habits, give sex instruction or prohibitions, train them to be independent and to control aggression, was studied by Dr. Whiting in collaboration with Dr. Irvin L. Child, of Yale University. The American study was conducted on "middle-class" mothers.

American mothers, they found, seem to be in a big hurry to start training their babies. American babies are weaned earlier and must get their toilet training and sex training way ahead of most other children.

But the American mother does not hold the record for nonindulgence in nursing her baby. That goes to a Polynesian tribe, the Marquesans, where the mothers believe that nursing the baby will spoil their beauty. Feeding times have nothing to do with the protests of the child. Only in this tribe, among the Maori, and in the American middle class, is the baby weaned before he is a year old. Two societies do not wean their youngest children at all, but the average is two and a half years.

Babies are trained in modesty all over the world, even where adults do not wear clothes. The Kwoma of New Guinea, for example, teach girls to sit modestly and boys not to stare at girls or women. Americans have a just average rating in modesty.

In this tribe, the lucky babies receive the most indulgent care from their mothers. The tribe is polygynous, and when the baby is born the mother is excused from all household and gardening cares, and devotes herself entirely to the baby until the child is weaned. During this time, the co-wife must do all the other work.

In punishment for aggression, again the American middle-class stands on middle ground. Among two peoples, the Lepcha and Hopi, aggression is discouraged completely and consistently from birth. The Kwoma, on the other hand, give specific encouragement and training in aggression during childhood. Ratings were made separately for physical aggression, verbal aggression, property destruction and wilful disobedience. Property destruction is punished most severely, wilful disobedience next. Least severely punished form of aggression is physical aggression.

With regard to severity, the American mother takes her place at the most harsh end of the scale with regard to sex and toilet training. She is most indulgent in training for independence. She is just average in weaning her baby and in teaching him to control his aggressiveness.

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PHYSICS

Instrument Measures Height Of Radio Reflecting Layers

➤ RADIO broadcasts will come through more clearly because of a new instrument that helps select the best radio frequencies to use for broadcasts. It shows automatically what is happening to the invisible layers of the earth's upper atmosphere. It is this series of ionized layers, 50 to 250 miles above sea level, that bounces radio waves back to the earth and enables us to hear distant broadcasts.

Several months in advance the National Bureau of Standards predicts the best radio frequency for large radio companies and radio "hams" to use in getting messages through to listeners at distant points. When there is little ionization, only a narrow band of frequencies can be used successfully.

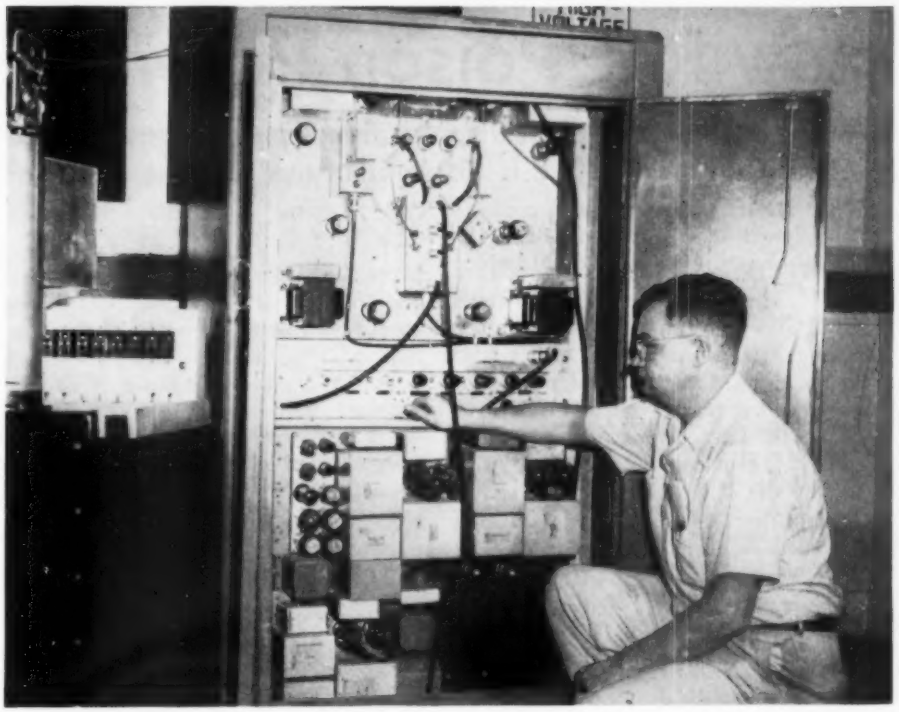
Radio waves come through most clearly when the upper atmosphere, or ionosphere, contains a large number of electrons knocked out of atoms.

The recorder shows the height of the echoing layer by measuring the time it takes for a radio signal to be bounced back. Within seven and a half seconds it can determine the lowest and highest layers of the ionosphere that will return a signal. This information helps make up-to-the-minute forecasts on how well shortwave broadcasts will get through.

Plans have been made to install these instruments in the Bureau's many ionosphere stations operated throughout the world. One is now working at the ionospheric research station at Sterling, Va., busily collecting the information needed for radio forecasting. The first model was developed by the Bureau's Central Radio Propagation Laboratory in time to study how last summer's eclipse affected radio propagation.

An innovation in this model is the incorporation of a motion picture camera in the apparatus. Here curves showing what is happening to the ionized layers of the sky are recorded on motion picture film. By rapidly projecting this series on a screen, radio experts get a good idea of what is happening to the invisible reflecting layers.

This improved recorder promises to aid us in determining how best to get radio mesages through. It will also tell us more about radiations from the sun and physical conditions of the earth's outer atmosphere.



***BETTER RECEPTION**—This new instrument registers automatically the height of invisible layers of the earth's upper atmosphere, which are responsible for distant broadcasts getting through by bouncing radio waves back to the earth. It is possible with this instrument to predict best radio frequencies for broadcasts.*

BIOLOGY-AAAS

Body Collects Radiocarbon

Beeswax and wood charcoal show just about the same radioactivity found in new methane occurring in sewage, confirming theory.

➤ YOU have radioactive carbon in you. You will continue to have it even after you die, and if there is anything left of your remains 5,000 years from now, the radiocarbon in them will still be able to make a Geiger counter tick.

Experiments proving that all living things are collectors of radioactive carbon, C14, were described by Prof. Willard F. Libby of the University of Chicago. The work was done by a group of research workers, under the joint auspices of the Institute for Nuclear Studies at the University and the Houdry Process Corporation.

Theoretical considerations pointed to the probability that radioactive carbon is produced in the upper atmosphere through cosmic-ray bombardment, and then is concentrated in living plants and animals. Such carbon has a measured half-life of 5,000 years.

Following a first demonstration of its actual presence in methane produced by bacteria in sewage, Prof. Libby and his associates have now proven its existence in beeswax and wood charcoal. These substances show just about the same radioactivity as is put forth by the sewage methane. As a check, methane from petroleum was tested, and found quite devoid of radioactivity. Although petroleum had an ultimate source in living creatures, they have been dead so long that all their radioactive carbon atoms have "died", too.

One possible application of this new discovery, Prof. Libby said, is the more accurate determination of the age of recent geologic deposits. If they are less than 40,000 years old, the traces of radiocarbon can be measured to calculate their age.

CHEMISTRY-AAAS

New Rat Poison Potent

Castrix is reported to be five times more effective than ANTU and 1080. It is also poisonous to dogs, cats and other animals.

➤ CASTRIX, a poison even rougher on rats than the recently announced ANTU and 1080, made its bow at the meeting. Prof. Kenneth P. DuBois who gave out the bad news for rodents, developed the compound from a German formula in the University of Chicago's Toxicity Laboratory on a project sponsored by the U. S. Chemical Corps.

Castrix, he said, is at least five times more effective than ANTU and 1080, is readily accepted in rat baits, and does not produce a tolerance if it fails to kill the first time. It produces violent convulsions, which end in death in less than an hour.

Like 1080, it is poisonous to dogs, cats and other animals; but it has effective antidotes in the barbiturates, already widely used in human medicine as sleep-inducing drugs. An animal given 20 times the ordinary lethal dose would recover after the administration of a barbiturate, even though convulsions had set in. Castrix is thus the only highly toxic rat poison that has an effective antidote.

2,4-D Injures Cotton

➤ COTTON seems to be one of the most sensitive of all plants to the weed-killing chemical 2,4-D, so when 2,4-D was dusted on water hyacinth and rice-field weeds in Louisiana last summer some sensational damage was done to neighboring cotton fields by dust that drifted to where it had no business to be.

Among the symptoms of 2,4-D injury described by Prof. Clair A. Brown of Louisiana State University, were leaves with abnormally long points and ruffled margins, malformed flowers with dwarfed petals grown together, and worst of all a premature dropping of buds and flowers with corresponding reduction in yield. Losses of as much as 60% of the crop were reported.

Elm Disease Remedy

➤ TREATMENT for elm trees afflicted with the fungus blight that has been improperly christened the Dutch elm disease may be at hand. Dr. Albert E. Dimond of the Connecticut Experiment Station told of watering the ground around half of a grove of 200 purposely infected elms with a solution of oxyquinoline benzoate, leaving other trees supplied with water only as controls. After three weeks, 47 of the untreated trees showed marked symptoms of the disease, while only 29 of the treated trees were visibly sick.

Don't Go to Ant

➤ THE world's most completely socialized beings—bees, ants and termites—do not afford models which man will ever be able to follow, even if he should want to, Prof. Ernest N. Cory of the University of Maryland declared at the meeting. Prof. Cory spoke as retiring president of the American Association of Economic Entomologists, an affiliated organization.

These insects, which have developed highly efficient, almost frictionless communities through ages of evolution, have done so only at the expense of eliminating practically everything that makes human beings human, the speaker pointed out. There is no such thing as individual initiative, not even much that could be recognized as individual wish or impulse. Any given insect's position in the colony, as well as its work and its whole life activity, is predetermined literally in the cradle.

Insects on Bikini

➤ INSECTS on the islands of Bikini atoll seem to be calmly unconscious that there ever were such things as atom bombs. It seems more likely that if any disturbance in the natural insect population of the area took place it came as a result of a mass DDT-ing of the islands before the tests, to abate the plague of flies.

Dr. A. C. Cole, Jr., of the University of Tennessee, who participated in the scientific resurvey of the islands last summer, regretted that no insect survey had been made prior to the dousing of the area with DDT, because now it is impossible to obtain any basis for comparison.

Phosphate Gardens

➤ PEBBLE PHOSPHATE rock from Florida, and crushed phosphate rock with the natural fluorine removed were two of the "gravel" varieties used in experiments on soilless cultivation of hothouse flowers conducted by Dr. Neil W. Stuart of the U. S. Department of Agriculture at the plant industry station at Beltsville, Md. This phosphate-rock "gravel" supplied all the phosphorus the plants needed for thrifty growth, Dr. Stuart reported.

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ASTRONOMY

Meteors Spotted by Radar Better Than Visually

➤ "SHOOTING STARS" are "seen" three times as often as radar echoes as they are spotted visually in the sky, if the experience of a group of Canadian astronomers is typical.

On five consecutive nights last August, when the shower of "falling stars" that each year seems to radiate from a point in the constellation of Perseus was at its height, meteors actually seen and those appearing on the radar scope were counted. A total of 3,700 radar echoes and only 1,100 visual meteors were recorded, during this, the year's best shower, Dr. Peter M. Millman of the Dominion Observatory, Ottawa, stated at the meeting of the American Astronomical Society at Columbus, Ohio.

Over 100 radar echoes lasting five seconds or longer coincided with the appearance of the brighter Perseid meteors—those as bright as the brightest stars in the sky. Not more than three of these could have coincided by chance, Dr. Millman estimates. But for 54 more of these brightest meteors there was no echo at all on the radar scope. This lack of a radar echo is puzzling.

Radar echoes lasting less than five seconds were 12 times as numerous as those of longer duration. For these, not enough "falling stars" were seen in the sky at the same time for any connection between the two to be considered.

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Great quantities of *synthetic rubber* will be used in the future, it is expected; alloyed with certain plastics they form a tough, resilient floor tile which is unaffected by oils and grease.

Attachment cords for kitchen electrical appliances should be kept free of grease or the rubber insulation may rot.

ASTRONOMY-AAAS

Navigation Simplified

Now possible to determine position of ship or plane in five minutes by sighting two stars at same height above horizon.

➤ A NEW method of determining the position of a ship at sea or a plane in the air that requires only five minutes of simple computation has now received approval by navigators and astronomers.

Based on spotting two bright stars when they are exactly the same height above the horizon, at sea the marine sextant was found adequate and in the air the bubble octant was sufficient. Thus no novel instrument is needed, O. C. Collins of the University of Nebraska stated.

Tests at sea and in the air show that navigators can obtain the latitude and longitude of a ship much more quickly and with far less effort than by methods now in use, Mr. Collins said, yet the result will be fully as accurate.

During the last 18 months the Army, the Navy, the Merchant Marine and American Overseas Airlines have cooperated in testing the new method and found it satisfactory, the University of Nebraska astronomer stated. It can be used 90% of the time that celestial observations can be made.

Gas on Planets?

➤ IF LIFE on some planets is impossible because of the presence of poisonous gas, astronomers will soon know about it. A search for carbon monoxide, the "garage gas" responsible for many deaths, in the atmosphere of Mars, Venus, Jupiter and other planets is being conducted by Dr. G. P. Kuiper at the McDonald Observatory of the University of Texas.

Only one of the satellites of Jupiter may have had a atmosphere at one time, Dr. Kuiper stated. Its reddish color is in striking contrast to the other three satellites. To date no detectable atmosphere has been found on the distant planet Pluto or on Neptune's satellite, Triton.

Lots of Stars Needed

➤ NUMEROUS stars must be visible in the background during a total eclipse of the sun if we are to determine just how much the star positions undergo Einstein shifts at eclipse time, Dr. G. Van Biesbroeck of Yerkes Observatory stated.

The stars were not close enough to the sun during last spring's eclipse for the shift to be measured accurately. Not until 1955, when a five-minute eclipse will be visible in the Philippines, will there be a new and better opportunity to test the theory of relativity in this manner.

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ARCHAEOLOGY

Toys on Wheels Made in Mexico Long Before Carts

➤ TOYS on wheels were made by the Indians of Mexico many centuries before Cortez reached the New World. Wheeled toys made in pre-Conquest times, long before carts on wheels were introduced from Europe, have been found in the Valley of Mexico, in central and northern Vera Cruz, and possibly in Oaxaca. Not just a fad that quickly passed, wheeled toys were made over a period of at least several hundred years.

The broken body of a figurine recently found in the town of Panuco, Vera Cruz, was discovered with the wheels in position, Dr. Gordon F. Ekholm of the American Museum of Natural History revealed. The axle, probably of wood or some other perishable material, was missing. Spots of asphalt near the central holes of the wheels indicate how the axle was held in place.

Several other toys have been found with tubular holes for the axle and perforated disks nearby. The holes in a tiny model found in Oaxaca are definitely worn smooth by turning axles.

These miniature vehicles were not copied from actual carts used in transport, Dr. Ekholm points out. Wheeled vehicles were not actually used as a means of transport anywhere in the New World in pre-Conquest time. Nor is it likely they were introduced from Europe at some earlier period.

Toys on wheels probably were a pure discovery or invention that was not put to practical use. A spindle with its whorl may have given someone the idea of the use of a wheel on a vehicle and he may simply have made a workable model of clay in the form of an animal. The crude workmanship of the wheels eliminates the possibility of these disks having been used in spinning.

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ANCIENT TOY—This toy with wheels was discovered in Vera Cruz. Asphalt near the central holes of the wheels indicates how the axles were held in place.

AERONAUTICS

Suggest Landing Planes In Greased Trough Runways

➤ A SCHEME for an airplane landing field that looks as if it had been inspired by watching a greased pig on an ice-hockey rink is the subject of newly-issued U. S. patent 2,433,238. The inventor, Humberto V. Ramirez, of Los Angeles, proposes to equip planes with streamlined resilient torpedo-shaped bodies instead of landing wheels, and to have the planes come down on runways consisting of long, shallow troughs containing a lubricant. Longitudinal flutings or ribs are to be provided, to give the plane the benefit of automatic steering as it slides to a stop.

This bold and unorthodox suggestion is an attempt to solve the rather tough problem presented by the rapidly increasing size of transport planes and the great weights they now carry. In order to double the landing surface of plane wheels, Mr. Ramirez points out, it is necessary to quadruple their size.

Lubricant costs need not be an insuperable obstacle to the adoption of the new landing system. Ordinary muddy water will work quite satisfactorily.

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ENGINEERING

Inside-Out Motors Built For Wind Tunnel Tests

➤ TWO new electric motors, revealed by General Electric, are unique. The first, a tiny spinner for use in testing missiles in wind tunnels, is dubbed an "inside out" motor. The second has speed regulation by a twist of a dial on the motor itself.

The inside-out motors have their rotating part on the outside and their stationary part on the inside. Ordinarily, the rotor is on the inside, enclosed by the stator which is the stationary part of an induction motor on which the field windings are placed to create an electric field. In this new motor, the rotor encloses the stator, revolving on a stationary shaft.

The motor is six inches long and less than two in diameter. It is rated at one-tenth horsepower, and has an extreme speed of 80,000 revolutions per minute. When mounted inside a missile, the exterior frame of the motor is fastened to the projectile's case, spinning it at high speeds so that its behavior in the air at supersonic velocities can be observed and measured.

The second motor will be produced in ratings of from three to 200 horsepower. Its feature is a stepless-speed adjustment, over a three-to-one ratio, by simply turning a dial. The entire unit, with the exception of the starting control, is in a housing only slightly larger than constant-speed motors of comparable ratings.

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PHYSIOLOGY

Chronic Alcoholics Escape Atherosclerosis, Cancer

➤ CHRONIC alcoholics escape one kind of artery hardening and cancer, it appears from figures reported by Dr. Sigmund L. Wilens of Bellevue Hospital and New York University College of Medicine in the *Journal of the American Medical Association* (Dec. 27).

One reason the chronic alcoholics get the special artery hardening less often than non-alcoholics is the relatively young age at which the alcoholics die.

Age at death, however, does not entirely explain the "remarkable resistance" to cancer shown by the alcoholics, Dr. Wilens states.

The blood vessel disease he studied is atherosclerosis, a kind of artery hardening in which the walls of the arteries undergo fatty degeneration. The word atheroma comes from the Greek for porridge or mush.

Fatty material has been found in the cysts in the artery wall in this condition. Scientists have therefore thought diets high in fats and perhaps proteins, also, led to the condition.

But the chronic alcoholic, if he drinks a pint of whisky a day, which is likely, probably gets most of his calories from the whisky. A pint would furnish 1,750 calories. So, even if he doesn't lose weight, he gets little fat or protein.

The finding that atherosclerosis attacks chronic alcoholics less often than non-alcoholics means, Dr. Wilens points out, that the fatty materials in the cysts in the artery walls do not necessarily come as such from the food eaten. They may, instead, be elaborated in the body from other substances.

Besides the relatively young age at death, the low incidence of high blood pressure and lesser tendency for damage in heart and brain, Dr. Wilens says, probably account for the apparent low incidence of atherosclerosis in chronic alcoholics.

Science News Letter, January 3, 1948

IN SCIEN

BOTANY

Find Male-Sterile Carrot Unable To Form Pollen

➤ CARROTS that are male-sterile, that is, unable to produce pollen although their flowers have female parts capable of forming seed when cross-pollinated, are reported in the journal *Science* (Dec. 12) by J. E. Welch and E. L. Grimball, Jr., of the U. S. Department of Agriculture experiment station, Charleston, S. C.

Discovery of a plant with only the female or seed-forming parts functional is always important to breeders, for it eliminates the tedious task of plucking off the stamens by hand that is necessary with normal-flowered plants before production of new hybrid strains can be attempted.

Male-sterile plants previously reported have included tomato, flax, onion, sorghum, barley and sugar-beet.

Science News Letter, January 3, 1948

ELECTRONICS

Television Transmission To Moon and Back Planned

➤ AN ambitious French scientist is now planning to send television images to the moon and back. He is inspired by the success of American radar experts in reaching the moon with their powerful transmitters and is reported to be now negotiating for the use of the same instruments.

The scientist is M. Edouard Belin who has already achieved much in long-distance television transmission. His plans were revealed by the French Embassy information service. The desire to use an American transmitter is because none powerful enough exists in France.

M. Belin expects to use what he designates as a "square" method. The image would first be transmitted from Paris to America, then by a powerful American instrument to the moon. The moon would receive the image and send it back, perhaps to a station in northern India, from which it would be relayed to Paris. The image would have travelled some 480,000 miles.

Science News Letter, January 3, 1948

NCE FIELDS

MEDICINE

Two Marines Get Leprosy Through Being Tattooed

➤ THE cases of two U. S. Marines who got leprosy through being tattooed are cited by the *Journal of the American Medical Association* (Dec. 27) as providing "strong evidence" that leprosy can be spread by inoculation.

The Marines were tattooed at Melbourne, Australia, by the same man on the same day. Both developed leprosy in the tattoos three years later, Drs. R. J. Porritt and R. E. Olsen report. The diagnoses of leprosy were made by the U. S. Public Health Service at its Marine Hospital at Carville, La., the national leprosarium.

Both the Marines and the tattooer were "inebriated," the medical report states, and a number of needles were broken during the tattooing. One of the Marines had a number of tattoos on his left arm but leprosy developed only in the tattoo made in Melbourne on the day his friend was tattooed.

The possibility of leprosy being spread by a needle is borne out by other cases reported in the past, the medical journal points out. One such case was that of a man who was assisting at an operation on a leper and got his finger pricked. Leprosy developed after several years. Another case was one in which leprosy developed in a man repeatedly injected with blood from a leper. Leprous skin sores developed in less than two months after the first inoculation.

Cases in which leprosy has not occurred following attempts to produce it by inoculation have also been reported, and have made this method of the spread of leprosy a matter for debate in the past.

Science News Letter, January 3, 1948

PHYSICS

Gigator Is New Name Proposed for Atom Smasher

➤ IF you begin to hear about a gigator, don't reach for your animal book. The gigator is no relation to the alligator.

The gigator, thus far, is just a proposal —for a powerful new atom-smasher. It was suggested recently by a Swiss physicist, Rolf Wideroe, in a communication to the American journal, the *Physical Review* (Nov. 15).

The name gigator, comes from the term gigavolt, a billion volts. Mr. Wideroe, of Brown, Boveri and Company, Baden, Switzerland, explains that the newly-suggested atom-smasher would be a circular accelerator for heavy particles. At certain voltages, he believes the gigator would be better than the synchrocyclotrons which several American atomic science centers either have in operation or under construction.

Science News Letter, January 3, 1948

AGRICULTURE

Raw Potatoes Replace Corn In Fattening Steers

➤ POTATOES can be used instead of grain for fattening cattle, experiments on the stock farm of Eugene K. Denton at Flanders, N. J., have demonstrated. Twenty yearling steers gained an average of 25 pounds each in a 25-day feeding period on a ration of 50 pounds of potatoes each per day. This replaced a daily feeding of 16 pounds of corn per day, and resulted in a total saving of four tons of corn for the whole feeding period.

Science News Letter, January 3, 1948

GENERAL SCIENCE

Science Talent Search Winners Hold Reunions

➤ YOUNG scientists from as far away as Korea gathered in Chicago, New York City and San Francisco on Dec. 26 for the regular Christmas reunions of winners in the Annual Science Talent Searches.

Frederic Petersen expected to arrive by Army transport in time to attend the one in San Francisco. T/5 Petersen, whose home is in Minden, Nebr., has spent several months with an isolated group of 96 Koreans whom he has trained as a fire fighting team. His talk of science has been limited to interpreters and sign language.

Approximately 60 of the 240 winners chosen in the last six Searches planned to attend one of the three unions.

The young scientists, all under 24 years of age, are attending 29 colleges and universities where they are specializing in sciences ranging from atomic physics to zoology. Twelve states and the District of Columbia were represented.

Science News Letter, January 3, 1948

GENERAL SCIENCE—AAAS

Young Scientists Tell How They Got Started

➤ THE youngest scientists attending the midwinter meeting of the American Association for the Advancement of Science in Chicago—in age from 17 to 24, in academic standing from high-school student to doctoral candidate—held their own special Junior Scientists' Assembly, to tell each other and assembled members of the AAAS and National Science Teachers Association how boys and girls first set their feet on the long trail of research.

Fifteen young scientists took part in the discussion, which was conducted under the chairmanship of Paul Teschan, Shorewood, Wis., first boy winner of the Westinghouse Grand Science Scholarship of $2,400 in the initial Science Talent Search conducted by Science Service in 1942. Mr. Teschan is now in the graduate medical school of the University of Minnesota. Eight of the other participants were also winners in the annual Science Talent Search, four are winners of the American Association for the Advancement of Science honorary junior membership awards, and three have been given honorary junior memberships in their respective State Academies of Science.

One of the two young women participating, Miss Evelyn Pease, Evansville, Ind., told of the difficult reactions she carries through as part of the work in organic syntheses in which she was launched as part of the war effort. Some of her work was on a series of new sulfa drugs.

Carl Stapel, Appleton, Wis., told of his scientific evolution from a boy fascinated with a motor-operated erector set to his present interest in some of the more advanced work in radio, especially narrow-beam frequency modulation. Projects now before him include frequency-modulating a beam of light, developing a light-operated radar set and putting a sound-operated radar set into use.

The phenomenon of thermophosphorescence has attracted Alfred T. Peaslee, Jr. This is the peculiar property of some substances, for example common salt, of shining with visible light when bombarded with X-rays. He split the light up into its spectrum, and measured the intensity of each wavelength band. He has plans for extending his research with other materials, using specially designed spectrographs.

Science News Letter, January 3, 1948

GENERAL SCIENCE

Science Previews for 1948

A billion years of space will be probed by the Mt. Palomar telescope; range of V-2 rockets may be doubled; attempts to control weather may be more successful.

By WATSON DAVIS

➤ HERE are sure things and long shots for science in the new year or in the years to come.

In 1948, good bets include:

1. The giant 200-inch telescope, world's largest, on Mt. Palomar, Calif., will go into service, reaching a billion years into the unprobed depths of space. While new close-up views of the moon, Mars and other planets will be obtained, greatest astronomical interest will be in the photographs of the spectra of distant stars in remote galaxies. They will tell whether the unsampled remote regions of the universe are like the part we live in.

Ancient Remains Sought

2. New discoveries of the remains of ancient man, especially in Africa and North America, will be sought, attempting to push back the antiquity of man in the western hemisphere to 30,000 to 40,000 years ago.

3. Flights of new jet planes and further development of guided missiles will be made, some of which will be kept secret for military reasons. Range of V-2 rocket may be doubled to beyond 200 miles.

4. Attempts will be continued to control weather and make rain by sprinkling clouds from airplanes, or new techniques, possibly with some practical successes.

5. People will see in the night sky a fairly bright object, Bester's Comet. It should be second or third magnitude (as bright as many well-known stars) along about March.

6. Airplanes will be fitted with CAA-developed crosswind landing gear, raising possibility of using single-runway landing fields for all types of planes, reducing airport size and allowing ports closer to cities.

7. New fundamental knowledge in biology and medicine of immediate practical importance will be discovered through use of radioisotopes from atomic pile.

8. Superconductivity, the extraordinary loss of electrical resistance at certain low temperatures by certain substances, will be further explored and possibly applied practically.

9. Beginning of construction of a gigantic billion-electron-volt atom smasher may take place, which should eventually duplicate cosmic radiation and bring about transmutations, nuclear rearrangements and possibly release of atomic energy by new mechanisms.

10. Attempt may be made to send a small rocket to the moon its arrival to be signaled to earth by a flash on the moon's surface.

These are just ten top possibilities of scientific achievement likely to climax in 1948. Some things that scientists are working on are more important but their future time-table is less definite. For instance:

Discovery of the secret of photosynthesis, how the green leaf converts sunshine into food and energy, may be possible in the future through research now in progress. If a photosynthesis process of even low efficiency were practical on an industrial scale, it would be more important than the peacetime use of atomic energy. It would be the major industrial advance of the century.

Cancer Cure a Hope

The discovery of the cause and cure of cancer (or at least the most prevalent kinds of the many varieties of cancer) is another great research objective, eventually to be achieved, but not really expected within the coming year.

Many diseases and potential epidemics need conquering through research, despite the great advances made in the last two decades. The world health picture is clouded for the future by our fear that in some places on the face of the earth scientists are working to create new and more deadly diseases to be used as weapons of war.

Failure to achieve international control of atomic energy and biological (germ) warfare under the United Nations places a large question mark before the future of civilization, including the progress of science.

Will the "cold war" now being waged, the chaos in many parts of the world, and eventually a fighting war, neutralize real scientific progress? War or conflict of any sort stops new fundamental research out of which the practical applications of the future must come. Applied military research now being accelerated in the United States, the U. S. S. R. and elsewhere is done largely at the expense of fundamental research.

Except for military research and development, science in the United States is still without major governmental support through a National Science Foundation. It may possibly be authorized by Congressional and Presidential action in the coming year.

On the international science scene, some progress in world cooperation is being made by UNESCO and the various international science unions. Look for some steps toward an international observatory where astronomers of various nationalities will be able to work together under United Nations auspices.

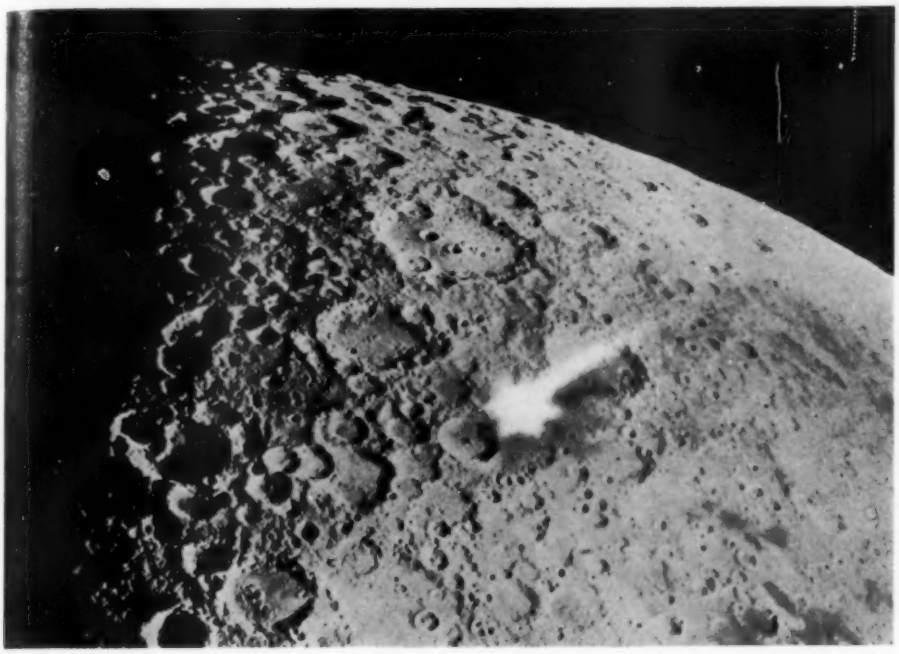
More Interchange

More interchange of scientific information and more travel of scientists in various countries will be stimulated by UNESCO and other international agencies. The Fulbright act that allows Americans to study and conduct scientific work out of proceeds of the sales of war surpluses abroad will provide means of travel and research abroad.

The acute world food situation will call for the cooperation and talents of scientists throughout the world. particularly on agricultural production. The foot-and-mouth disease invasion of Mexico will continue to be a major problem and a menace to the livestock industry of the western hemisphere.

Expect to hear about some more new insecticides for special uses and greater application of the older ones, such as DDT, developed during the past few years. More cities will join in the summer of 1948 the list of those communities that were made virtually flyless by clean-up campaigns and DDT spraying. There should be a nationwide campaign to eliminate the menace of poison ivy now that ways of eradicating it are known.

You will hear more about methods of farming that are useful in special situ-



SHOOTING AT THE MOON—An artist's conception of a rocket striking the moon, a possible achievement in the coming year, was made on a photograph taken by the 100-inch telescope at Mount Wilson Observatory. New close-up views of the moon will be made in 1948 with the 200-inch Mount Palomar telescope.

ations, such as killing weeds by flaming them or treating them with 2,4-D chemical.

Under the U. S. Atomic Energy Commission, several high-powered research centers are getting underway. It will take many months for them to begin producing on a large scale, but the long time benefits will be great and some immediate results can be expected in 1948. Brookhaven on Long Island, N. Y., Argonne near Chicago, and Oak Ridge in Tennessee, are the principal laboratories devoted to general exploration of the results of atomic fission, as well as those that have military applications. Add to these the outstanding Radiation Laboratory at Berkeley, Calif., General Electric's atomic laboratory near Schenectady, N. Y., and dozens of projects in university and industrial laboratories and you have a full-blown attack upon the secrets of the atomic nucleus in all its ramifications.

Mental illness continues to be a great economic and social loss as well as personal disaster. Group psychotherapy is likely to grow in favor in the coming months and the general practitioner will be found to take a greater interest in the psychological aspects of medicine. Electric shock therapy is likely to be used less in the treatment of mental disorders.

Television broadcasting will continue to grow slowly, dependent upon the operation of radio relays and co-axial cables between cities as well as the sale of receivers. The New York to Boston radio relay for high frequency and frequency modulation will go into operation regularly.

Science News Letter, January 3, 1948

GENERAL SCIENCE

'47 Predictions Come True

➤ YOU had advance information on what would happen in science when a year ago you read the Science Service forecast for 1947. (*See SNL,* Jan. 4, 1947.)

In aviation, for instance, it was predicted that instrument push-button landings would come into use and the round-trip across the Atlantic was one of the past year's major flights.

The first jet-propelled transport took to the air, as foretold.

The CAA ordered radar installed in some transport planes as an anti-collision device. Availability of such radar commercially was forecast.

Doubt was expressed as to whether the National Science Foundation would be created. Congress and the President were unable to agree on how it should be operated and it is still unfinished national business.

The solar eclipse in May was observed by extensive expeditions. This was a sure thing, of course.

The great 200-inch telescope did not actually go into service, as hopefully predicted, but its mirror did make the journey to the top of Mt. Palomar.

Some new and useful insecticides were made known as foreseen.

Soilless gardens in Japan did begin providing our occupation forces with fresh vegetables.

The U. S. Atomic Energy Commission got its peacetime development and research program underway.

Some of the admittedly long shots predicted for 1947 did not come through, but are still future possibilities:

Discovery of the secret of photosynthesis.

Control and prevention of some kinds of cancer.

Discovery of a new chemical element.

Operation of an atomic energy plant.

Science News Letter, January 3, 1948

PHOTOGRAPHY

New Full Color Process For Movies Announced

➤ PRINTING motion pictures in full color, by a new process revealed by Polaroid Corporation, of Cambridge, Mass., produces three separate color images on a single layer of standard black-and-white film from three color separation negatives.

The new process is known as Polacolor. Use of this standard film and essentially the same processing equipment employed in black-and-white movies makes the process relatively inexpensive. The new full-color movies are suitable for showing in standard projectors.

Printing the three color images is effected by conventional devices. All the film materials, chemicals and processing agents are available commercially. The Polacolor silver sound track is exposed and developed along conventional lines and has the same characteristics as conventional sound tracks for black-and-white moving pictures.

Science News Letter, January 3, 1948

ASTRONOMY-AAAS

Origin of Meteorites

All are shattered fragments from ancient planet smaller than earth that once moved in an orbit between those of Mars and Jupiter.

➤ METEORITES, those chunks of iron and stone that occasionally rush flaming down through the atmosphere and make crash landings on the earth, are all shattered fragments of an ancient planet that once revolved around the sun, Dr. Carl August Bauer, of the University of Michigan, told the section on astronomy of the American Association for the Advancement of Science.

The planet was smaller than the earth. It moved in an orbit between those of Mars and Jupiter, where the asteroids or minor planets are to be found today.

The speaker fitted the various types of stony and metallic meteorites that have been collected and studied into a picture of a planet considerably smaller than the earth but built essentially in the same way. Specifications call for a metallic core of iron and nickel, with the nickel most concentrated towards the center but present in some proportion throughout. Outside of this was a stony shell, again with metal admixtures most abundant in its deeper part, grading down to practically nothing in a thin outer layer corresponding to the stony crust of the earth.

This theory of the ancient planet is made plausible by Dr. Bauer's studies indicating that meteorites may have been "artificially aged" by cosmic-ray bombardment in outer space, very much as whisky is sometimes hurried through the aging process by ultraviolet irradiation. Thus they are not always as old as they seem.

Heretofore, age of meteorites has been estimated largely on the basis of the small quantities of helium they contain, just as terrestrial rocks are judged. This is because the "orthodox" way for helium to originate is through the slow decay of uranium. This is all very well for earthly rocks, especially for those from well-buried sites; but it has now been shown that helium can also be produced by the impact of cosmic rays on various elements.

This "artificial aging" of meteorites, occurring irregularly, may very well be responsible for the great apparent differences in age among meteorites that have been analyzed, Dr. Bauer suggested. This explanation overcomes the principal objection to the otherwise quite plausible theory that these meteorites are the shattered fragments of an ancient planet.

What tore this ancient planet apart and scattered its pieces throughout a wide zone of planetary space is not even guessed at as yet. But although the fragments of that long-perished planet may not be as old as formerly assumed, they are by no means things of yesterday; for Dr. Bauer assigned to them an antiquity of "several hundred million years."

Science News Letter, January 3, 1948

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PSYCHOLOGY—AAAS

First-Born More Selfish

➤ THE oldest child in the family tends to be more jealous, more selfish—and neater. The younger brother or sister is likely to be happier, more generous—and more punished.

This effect of place in the family on personality was reported by Profs. W. Allison Davis and Robert J. Havighurst, of the University of Chicago. It applies, they found, to both colored and white families of the middle economic class.

Negro and white middle-class families are very much alike, they observed. They have the same number of children, are about the same age when they marry, and bring up their children in much the same way.

But the differences found are interesting. Negroes are more easy-going about feeding their babies whenever they want to nurse and they wean them later than do the white mothers. On the other hand, Negro mothers are more strict about toilet training.

Negro mothers give their girls more responsibility in the home but do not let them go to the movies as young as do the white mothers, it was found.

Intelligence tests are unfair to poor children, the same scientists told the meeting. Rich children, they say, have the advantage on three counts: they are more familiar with the situations described in the class of "scholastic" problem used, the words used are more common among wealthy people, and finally rich children are more likely to have a motive to work hard to solve an academic problem.

Reading is a serious handicap to the poor children, they found in an experiment with 516 school children. But the poorest children improve more than the richest children when the situations and words of the problems are chosen from among those more generally common in the United States.

Science News Letter, January 3, 1948

GENERAL SCIENCE

Old Italian Library Asks Aid To Rebuild Collection

➤ A FAMED Italian cultural center, the Ambrosiana Library and Art Gallery of Milan, has issued an international appeal for books and periodicals with which to rebuild its war-damaged scientific collection.

Already, 35 nations are represented in the contributions, but officials of the Ambrosiana are particularly anxious to receive more material from the United States. Scientific publications may be sent to Erminio Turcotti, an Italian civil engineer who is working on the restoration of the scientific library of the Ambrosiana.

Science News Letter, January 3, 1948

Ergot in grain causes ergotism in man; ergot is an important disease of rye, wheat, barley and many grasses which sometimes passes to humans eating the grain.

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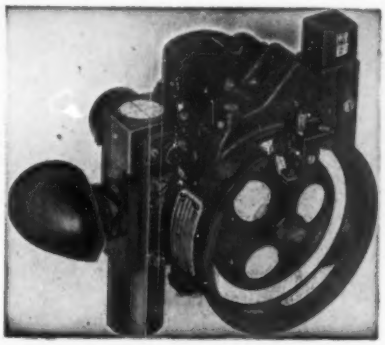

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METEOROLOGY

NATURE RAMBLINGS

by Frank Thone

No Duplicates

➤ SNOWS have fallen on the earth during millions of winters—millions upon millions of tiny frozen six-pointed stars in each storm. Human imagination simply balks at the job of calculating how many snow crystals there have been during the planet's long history. Yet, scientists assure us, no two of them have ever been exactly alike.

This declaration, to be sure, is based on a very small sampling. Only a few thousands of snow crystals have ever been actually photographed through a microscope. But it is true that among these thousands of permanent and detailed records no duplicates exist.

It is fascinating to go through the pictured pages of the classic book on snow crystals by Bentley and Humphreys, with its pages upon pages of magnificent snow photomicrographs, comparing one picture with another. Sometimes you think you almost have twin portraits—but "almost" is as close as you ever get. Always some little detail in size, or lacy sculpturing, or delicate surface marking defeats the search for absolute identity.

It should be possible now to put this no-duplicates dictum to the test, since scientists have shown us how to produce snow crystals at will, and under controlled laboratory conditions, by dry-ice "seeding" of masses of super-cooled water vapor. By using the same degrees of dampness and cold, and the same quantities of dry-ice powder of uniform particle size, it should be possible to produce quantities of snow crystals of the same general types at least, and perhaps approaching identity in shapes and patterns even if not quite attaining it.

Probably the best chance of finding twins among snow crystals would be found under conditions simulating the deep cold and low atmospheric pressure of the upper snow-forming levels of the air. Natural snow crystals from these severe upper reaches have a Doric simplicity of outline and patterning, as compared with the Rococo filigree-work of the branched and re-branched stars that form in the denser, less cold clouds that form low ceilings on gray winter days.

Science News Letter, January 3, 1948

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METEOROLOGY

Snow and Blizzards Made

Climatic chamber of Army Signal Corps, as large as four-room house, has temperatures at 40 degrees below zero and continuous artificial snow.

See Front Cover

➤ ACTUAL snow on a continuous basis is being made by man in climatic test chambers of the Army Signal Corps at Fort Monmouth. It is made in sufficient quantities to test military equipment under simulated Arctic conditions, and is believed to be the first accomplishment of its kind on record.

By the use of blowers, made-to-order blizzards are developed. The climatic test chamber used is as large as a four-room house and can hold a truck and trailer. Temperatures can be maintained at 40 degrees below zero Fahrenheit by a giant refrigerator plant. One of these chambers is shown on the cover of this week's SCIENCE NEWS LETTER.

A careful pre-conditioning of the test room precedes the manufacture of snow. This period is of sufficient length to remove much of the heat stored in the inside air and the building itself. Steam at high temperatures is then injected into the room to create an atmosphere saturated with moisture and containing water vapor in suspension. This forms a visible cloud or fog.

This cloud rapidly cools to a temperature below the freezing point of water to form what is called a super-cooled cloud. Dry ice does the rest. When the super-cooled cloud is at a temperature under 10 degrees above zero, a small bag of dry ice, about the size of a finger tip, is shaken in it. When the cloud reaches a temperature near minus 40, the water vapor crystallizes, forming literally billions of microscopic snow crystals. These unite to form snowflakes that fall to the floor and blanket it.

Science News Letter, January 3, 1948

MEDICINE

Tonsil Removal Doesn't Predispose to Polio

➤ A tonsil operation does not appear to predispose a child to poliomyelitis, a study at the University of California Medical School indicates.

Dr. Paul M. Pederson, aided by Drs. E. B. Shaw and A. Palermo, said their study of 492 cases hospitalized between 1941 and 1945 in the County Hospital and the Children's Hospital at San Francisco indicated no material difference in the ratio of polio to recent tonsillectomy and the incidence of polio in the general population.

Dr. Pederson found, in the 34 counties from which the patients came, that there had been a total of 2,057 cases of polio and 57,796 known tonsillectomies in the same period of study.

The incidence of poliomyelitis to general population in the epidemic year 1943, for example, was one to 1,960, while the incidence of polio following tonsillectomy for the same year was one to 1,782, or five cases in 8,910.

Science News Letter, January 3, 1948

Books of the Week

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THE AMERICAN COLLEGE DICTIONARY—Clarence L. Barnhart, ed.—*Random House,* 1432 p., $5.00. This up-to-date compendium includes correct definitions for many new scientific terms.

AMERICAN MEDICAL RESEARCH: Past and Present—Richard H. Shryock—*Commonwealth Fund,* 350 p., $2.50. Historical survey of the development and achievements of medical research in the United States; references to popularization of medicine, particularly by Science Service, need elaboration and correction.

AMERICA'S DESTINY—Herman Finer—*Macmillan,* 408 p., $5.00. The author contends that it is America's destiny to assume the position of world leadership formerly occupied by England, and to enforce peace and democratic rights in the world.

BROKEN HOMES—George Thorman—*Public Affairs Comm.,* Pamphlet No. 135, 30 p., illus., 20 cents. An analysis of the causes and effects of the break-up of family life—by death, divorce, desertion, or involuntary separations.

CHILDREN IN THE COMMUNITY—Sybil A. Stone, Elsa Castendyck, and Harold B. Hanson—U. S. Children's Bureau Publication No. 317—*Govt. Printing,* 182 p., 35 cents.

DOUGLAS OF THE FIR—Athelstan George Harvey—*Harvard Univ.,* 290 p., illus., $4.00. An interestingly written account of the life and travels of this famous explorer and horticulturist.

EASTERN ALGONKIAN BLOCK-STAMP DECORATION: A New World Original or an Acculturated Art—Frank G. Speck—*Archaeological Soc. of N. J.,* Research Series No. 1, 62 p., illus., $2.00.

FEDERAL DUCK STAMPS AND THEIR PLACE IN WATERFOWL CONSERVATION—Edna N. Sater—*Govt. Printing,* No. 3, Fish and Wildlife Service, Department of the Interior, 14 p., 15 cents.

FOOD, NUTRITION AND HEALTH—E. V. McCollum and J. Ernestine Becker—*Published by the authors at Johns Hopkins Univ.*—146 p., $2.00. For the layman, a concise guide to the science of nutrition.

HANDBOOK OF GEM IDENTIFICATION—Richard T. Liddicoat, Jr.—*Gemological Inst. of Am.,* 283 p., illus., $4.50. Jewelers, gemologists and students will find useful this manual, which includes a comprehensive index as well as a glossary of the usual gemological terms.

HELPING CHILDREN IN TROUBLE—U. S. Children's Bureau, Federal Security Agency, Publication 320—1947—*Govt. Printing,* 17 p., illus., 10 cents.

HERITAGE OF FREEDOM—Frank Monaghan—*Princeton Univ.,* 150 p., illus., $3.50. Published in cooperation with the American Heritage Foundation, this account of the historical significance of each of the documents exhibited on the Freedom Train includes facsimile reproductions of about 30 principal testaments to our freedom.

THE INDUSTRIAL STUDY OF ECONOMIC PROGRESS—Hiram S. Davis—*Univ. of Pa.,* Research Studies XXXIII, 187 p., $2.75. The Director of the Industrial Research Department, Wharton School of Finance and Commerce, presents basic concepts and methods of applying the industrial approach to the study of economic progress.

THE LOGIC OF THE SCIENCES AND THE HUMANITIES—F. S. C. Northrop—*Macmillan,* 402 p., $4.50. Explorations into the applications of deductive, inductive, and institutional logic in the varied scientific methods of the natural and social sciences and the humanities.

MEASUREMENT OF CONSUMER INTEREST—C. West Churchman, Russell L. Ackoff, and Murray Wax—*Univ. of Pa.*—214 p., $3.50. This book is the result of a conference on experimental method in consumer analysis, sponsored by the University of Pennsylvania in May, 1946.

MICROSCOPIC ANATOMY OF VERTEBRATES—James I. Kendall—*Lea and Febiger,* 3rd ed., 354 p., illus., $6.00. A text intended to supply a working knowledge, supplementary to courses in comparative anatomy and embryology as a foundation for physiology and graduate work.

THE PENNSYLVANIA RAILROAD: A Pictorial History—Edwin P. Alexander—*Norton,* 248 p., illus., $6.00. A copiously illustrated account of one of the greatest transportation systems in the United States.

ROCKET SHIP GALILEO—Robert A. Heinlein—*Scribner,* 212 p., illus., $2.00. The author's conception of the first piloted rocket ship flight to the moon, for boys.

THE SCIENTIFIC PAPER: How to Prepare It, How to Write It—Sam F. Trelease—*Williams and Wilkins,* 152 p., $2.00. Designed to aid scientists and students in the preparation of technical papers and theses, this revised edition of "The Preparation of Scientific and Technical Papers" is compact yet comprehensive.

SOVIET EDUCATION—Maurice J. Shore—*Philosophical Lib.,* 346 p., $4.75. History and analysis of the principles of Marxian planned education, geared to the life process within which they operate.

TECHNIQUE OF HOUSE NAILING—Housing and Home Finance Agency—*Govt. Printing,* 53 p., illus., 20 cents.

TREE-RING HYDROLOGY IN SOUTHERN CALIFORNIA—Edmund Schulman—*Univ. of Ariz.,* Laboratory of Tree-Ring Research Bulletin No. 4, Vol. XVIII, No. 3, 36 p., 35 cents.

TRENDS IN OUTPUT AND EMPLOYMENT—George J. Stigler—*Nat'l. Bur. of Econ. Res.,* 25th anniversary series, 67 p., $1.00.

THE WORLD WITHIN—Mary Louise Aswell, ed., with introduction and notes by Frederic Wertham—*Whittlesey House,* 376 p., $3.75. Fifteen chapters from famous fiction, illustrative of the neuroses of modern life, with notes on the literary merit and scientific accuracy of each selection.

YOUR PLANS FOR THE FUTURE—Mary Ford Detjen and Ervin W. Detjen—*Whittlesey House,* 294 p., illus., $2.50. For young people, a timely and interesting discussion of the diverse problems of correlating education to career choices.

Science News Letter, January 3, 1948

GEODESY

Chaff that Baffled Radar Now Helps Army Mapping

➤ CHAFF, the aluminum foil used by U. S. military forces to baffle enemy radar warning systems, is being utilized now in a new and novel manner by U. S. Army engineers working from the headquarters of the Caribbean Command at Quarry Heights, C. Z.

In a plan developed by Col. Fremont Tandy and Capt. William Hatcher, the aluminum foil, which resembles Christmas-tree tinsel, is dropped from airplanes to mark designated high spots in the jungles of Panama. This facilitates the mapping of that entire country, now being carried on by the U. S. Army Engineers working in ground survey parties proceeding through the jungle on foot.

Formerly, to obtain geodetic information, the survey parties with their heavy equipment had to climb all the peaks in each locality to determine the highest summit. Now, an airplane flies overhead, determining the highest point among several with its nontarnishable chaff on the loftiest peak, from where it is visible for several miles. Days of wearisome climbing are saved.

It is predicted that this inexpensive marking device may become a standard mapping procedure in jungle areas throughout the world when its efficiency has become established.

Science News Letter, January 3, 1948

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• New Machines and Gadgets •

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❁ *CAP-CATCHING HOUSING* for the familiar bottle opener is a plastic casing with a recess within which the cap-remover is fixed. When the neck of the bottle is inserted and the cap removed in the ordinary manner, the cap drops into the box-like bottom instead of on the floor.

Science News Letter, January 3, 1948

❁ *FIBERGLAS* acoustical tiles for room ceilings and sidewalls are noncombustible and have high sound-absorbing properties. Painted white at the factory, the one-foot-square light-weight tiles can be cemented to a solid backing or held in place by wood or metal furring strips.

Science News Letter, January 3, 1948

❁ *ADJUSTABLE RADIUS CHAIR* swings on a circle of two-foot radius to permit the worker to use two or more desks. The chair itself is on the end of a horizontal arm which can be slid back and forth through a pivot top to a solid metal base which is bolted to the floor.

Science News Letter, January 3, 1948

❁ *BELT*, for transmitting power in various types of machines, has rubber teeth that fit into grooved pulley wheels designed for use with it. It is made of steel cables embedded in synthetic rubber, is highly flexible, almost noiseless in action, and permits no slippage.

Science News Letter, January 3, 1948

❁ *PAINT BRUSH CONTAINER*, shown in the picture, is an airtight and liquid-tight plastic bag in which brushes may be stored with or without cleaning. The oil in the residue paint itself keeps the bristles soft and pliable if the elastic band on the top is properly tightened.

Science News Letter, January 3, 1948

❁ *RUBBER LUNG*, for artificial respiration to victims of drowning and electric shocks, is built around a large rubber bellows with an electric pump to force air in and out, simulating breathing. Light in weight in comparison with the ordinary steel lung, it can be easily carried and folded for storage.

Science News Letter, January 3, 1948

❁ *PIPE CUTTER* has a push-button release and lock which enables an operator to adjust the tool instantly on pipe from one-quarter inch to two inches in size. The pull-open, push-close action is a work-time saver, and an exclusive follower wheel assures fast, true work.

Science News Letter, January 3, 1948

❁ *BUTTER CONDITIONER*, built into the wall of a new electric refrigerator, keeps the butter in safe condition but soft enough to be easily spread. The conditioner compartment holds one pound of butter at a time.

Science News Letter, January 3, 1948

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Question Box

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Photographs: Cover, p. 14, U. S. Army Signal Corps; p. 3, U. S. Navy; p. 5, National Bureau of Standards.

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